

Miniaturized Radiation Hardened Beam-Steerable GPS Receiver Front End, Phase II

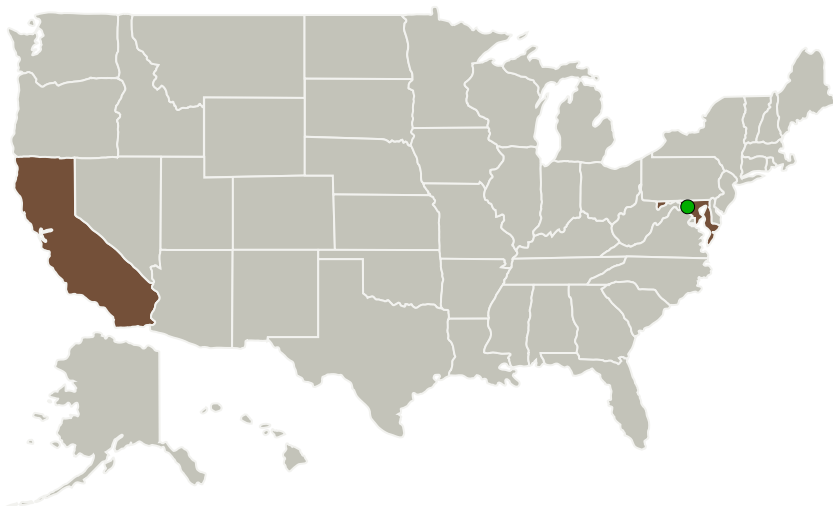
Completed Technology Project (2012 - 2014)



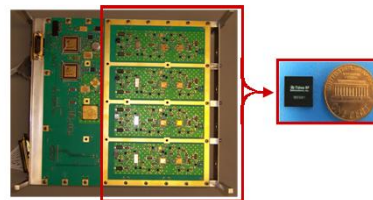
Project Introduction

Position, Navigation and Timing (PNT) capability via GPS services are used by NASA for (1) real-time on-board autonomous navigation, (2) attitude determination and (3) earth science including sea height and climate monitoring. It is expected that over the next two decades approximately 95% of ALL space missions will operate within the GPS service envelope. GPS receivers will be "embedded" in most instruments and will require improved SWaP and increased sensitivity for improved tolerance from large interferers and/or ruggedness to multipath errors. The RFIC developed in this Phase II will have 4 coherent GPS receivers on a single silicon die which improves the SWaP metric over the existing solution by 30x. In addition to supporting beam steering capability, it'll provide interference tolerance and signal recovery in multipath environment, such as those during positioning of precision equipment on the International Space Station (ISS). The other NASA programs that will benefit from this device are: 1. Magnetospheric Multiscale Mission 2. Sexton GPS receiver for Xray Telescope on ISS. 3. COSMIC IIA,B Missions 4. Jason III Mission for Oceanography The schedule in this proposal will have the delivery of the initial prototype samples made available to NASA in 12 months. Estimated TRL In: 3 Estimated TRL Out: 4

Primary U.S. Work Locations and Key Partners



Proposed GPS RFIC Improves SWaP by 30X



Miniaturized Radiation Hardened
Beam-Steerable GPS Receiver
Front End Project Image

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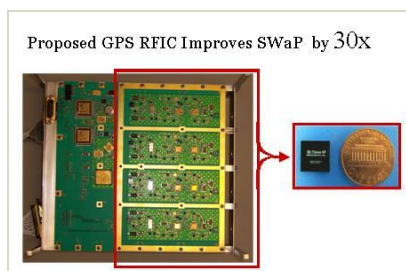


Organizations Performing Work	Role	Type	Location
Tahoe RF Semiconductor Inc.,	Lead Organization	Industry	Auburn, California
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations

California	Maryland
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Images



Project Image

Miniaturized Radiation Hardened Beam-Steerable GPS Receiver Front End Project Image
(<https://techport.nasa.gov/image/130111>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Tahoe RF Semiconductor Inc.,

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Michael Shaw

Co-Investigator:

Michael J Shaw

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Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
 - └ TX17.4 Attitude Estimation Technologies
 - └ TX17.4.3 Attitude Estimation Sensors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System